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IN THE CLAIMS:

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LISTING OF CLAIMS:

1. (Currently Amended) A method for obtaining an attribute within a triangle, comprising:
 - obtaining the vertices of a triangle, each vertex being represented by a set of coordinates in a world coordinate space and having at least one[an] attribute;
 - for each vertex, transforming the world space coordinates and the attribute of the vertex to coordinates and an attribute in viewer space to create viewer space coordinates and a viewer space attribute, said viewer space coordinates being homogeneous coordinates, computing a set of homogeneous coefficients of the [vertex]triangle based on the viewer space vertex homogeneous coordinates, said homogeneous triangle coefficients including perspective data, and projecting the viewer space coordinates of the vertex to coordinates in 2D screen space;
 - determining, in the 2D screen space, pixels that are affected by the triangle based on the 2D screen space coordinates; and
 - for each pixel affected by the triangle, computing, based on the homogeneous triangle coefficients, a set of barycentric coefficients in viewer space, and performing a linear interpolation based on the set of viewer space barycentric coefficients and the viewer space attributes of the triangle vertices to obtain the attribute of the pixel affected by the triangle.
2. (Currently Amended) A method as in claim 1, wherein, for each vertex, the coordinates and attribute in viewer space are represented respectively by $[X_{ih}, Y_{ih}, Z_{ih}, W_i]$ and $[P_{ia}...n_h][P_{iah}...Pin_h]$, where 'i' is an index associated with the vertex and $i = 1, 2, 3$, and where W_i is a homogeneous component representing a perspective correction parameter.
3. (Canceled)
4. (Original) A method as in claim 1, wherein determining the pixels affected by the triangle includes rasterizing the triangle.

5. (Original) A method as in claim 1, wherein determining the pixels affected by the triangle includes providing blank pixel data associated with the affected pixels.

6. (Original) A method as in claim 5, wherein for N pixels affected by the triangle the blank pixel data includes N screen space coordinates $\{[X_1s, Y_1s], [X_2s, Y_2s], \dots, [X_Ns, Y_Ns]\}$.

7. (Original) A method as in claim 4, wherein the rasterization provides blank pixel data associated with the pixels affected by the triangle.

8. (Canceled)

9. (Canceled)

10. (Previously Amended) A method as in claim 1, wherein the depth and perspective data of each of the pixels affected by the triangle is represented by parameters in the homogeneous space.

11. (Previously Amended) A method as in claim 1, wherein the attribute obtained in the homogeneous space is depth.

12. (Previously Amended) A method as in claim 1, wherein the attribute obtained in the homogeneous space is color.

13. (Previously Amended) A method as in claim 1, wherein the attribute obtained in the homogeneous space is texture.

14. (Previously Amended) A method as in claim 1, wherein the attribute obtained in the homogeneous space is shading.

15. (Currently Amended) A system for obtaining an attribute within a triangle in

homogeneous space, comprising:

means for obtaining the vertices of a triangle, each vertex being represented by a set of coordinates in a world coordinate space and having at least one[an] attribute;

means for transforming the world space coordinates and the attribute of each vertex to coordinates and an attribute in viewer space to create viewer space coordinates and a viewer space attribute, said viewer space coordinates being homogeneous coordinates;

means for computing a set of homogeneous coefficients of [each vertex]the triangle based on the viewer space vertex coordinates, said homogeneous triangle coefficients including perspective data;

means for projecting the viewer space homogeneous coordinates of the vertex to coordinates in 2D screen space;

means for determining, in the 2D screen space, pixels that are affected by the triangle based on the 2D screen space coordinates; and

means for computing, based on the homogeneous triangle coefficients, a set of barycentric coefficients in viewer space for each pixel affected; and

means for performing a linear interpolation based on the set of viewer space barycentric coefficients and the viewer space attributes of the triangle vertices to obtain the attribute value of each pixel affected by the triangle.

16. (Currently Amended) A method as in claim 15, wherein, for each vertex, the coordinates and attribute in viewer space are represented respectively by $[X_{ih}, Y_{ih}, Z_{ih}, W_i]$ and $[P_{ia} \dots P_{ih}]$, where 'i' is an index associated with the vertex and $i = 1, 2, 3$, and where W_i is a perspective correction parameter.

17. (Canceled)

18. (Original) A system as in claim 15, wherein means for determining the pixels affected by the triangle includes means for rasterizing the triangle.

19. (Original) A system as in claim 15, wherein the means for determining the pixels affected by the triangle includes means for providing blank pixel data associated to these pixels.

20. (Original) A system as in claim 19, wherein for N pixels affected by the triangle the blank pixel data includes N screen space coordinates $\{[X_1s, Y_1s], [X_2s, Y_2s], \dots, [X_Ns, Y_Ns]\}$.
21. (Original) A system as in claim 18, wherein the rasterization means provides blank pixel data associated with the pixels affected by the triangle.
22. (Canceled)
23. (Canceled)
24. (Previously Amended) A method as in claim 15, wherein the depth and perspective data of each of the pixels affected by the triangle is represented by parameters in the homogeneous space.
25. (Previously Amended) A method as in claim 15, wherein the attribute obtained in the homogeneous space is depth.
26. (Previously Amended) A method as in claim 15, wherein the attribute obtained in the homogeneous space is color.
27. (Previously Amended) A method as in claim 15, wherein the attribute obtained in the homogeneous space is texture.
28. (Previously Amended) A method as in claim 15, wherein the attribute obtained in the homogeneous space is shading.
29. (Previously Amended) A programmable device for obtaining an attribute in homogeneous space, comprising:
a computing unit;
a processor; and

a memory with program instructions, the processor being operatively connected with the memory, and the computing unit, for causing the programmable device to perform the steps of:

obtaining the vertices of a triangle, each vertex being represented by a set of coordinates in a world coordinate space and having at least one[an] attribute;

for each vertex, transforming the world space coordinates and the attribute of the vertex to coordinates and an attribute in viewer space to create viewer space coordinates and a viewer space attribute, said viewer space coordinates being homogeneous coordinates, computing a set of homogeneous coefficients of the [vertex]triangle based on the viewer space homogeneous vertex coordinates, said homogeneous triangle coefficients including perspective data, and projecting the viewer space coordinates of the vertex to coordinates in 2D screen space;

determining, in the 2D screen space, pixels that are affected by the triangle based on the 2D screen space coordinates; and

for each pixel affected by the triangle, computing, based on the homogeneous coefficients, a set of barycentric coefficients in viewer space, and performing a linear interpolation based on the set of viewer space barycentric coefficients and the viewer space attributes of the triangle vertices to obtain the attribute of the pixel affected by the triangle.

30. (Original) A programmable device as in claim 29, wherein the computing unit includes a unit having two ALUs (arithmetic logic units); and a reciprocal unit.

31. (Original) A programmable device as in claim 29, wherein the processor includes at least one programmable single instruction multiple data (SIMD) scalar unit.

32. (Currently Amended) A programmable device as in claim 29,

further comprising[:] a bypass register[,]; and

wherein the computing unit includes two-ALUs configured to operate with shifted processing cycles, using the bypass registers, to interleave triangle and pixel processing instructions.

33. (Original) A programmable device as in claim 29, further comprising a triangle rasterizer operative to produce blank pixel screen coordinates for the pixels affected by the triangle.
34. (Original) A programmable device as in claim 29, further comprising a vertex geometry processing unit operative to provide the viewer space coordinates.
35. (Original) A programmable device as in claim 29, operative to perform operations in long floating point (FP) mode, short FP mode, and mixed long-short FP mode.
36. (Original) A programmable device as in claim 29 operative to perform depth, color, shading and texture interpolations.
37. (Currently Amended) A method for obtaining an attribute within a triangle, comprising:
 obtaining the vertices of a triangle, each vertex being represented by a set of coordinates in a world coordinate space and having at least one[an] attribute;
 for each vertex, transforming the world space coordinates and the attribute of the vertex to coordinates and an attribute in viewer space to create viewer space coordinates and a viewer space attribute, said viewer space coordinates being homogeneous coordinates, computing a set of homogeneous coefficients of the [vertex]triangle based on the viewer space homogeneous vertex coordinates, said homogeneous triangle coefficients including perspective data, and projecting the viewer space coordinates of the vertex to coordinates in 2D screen space;
 determining, in the 2D screen space, pixels that are affected by the triangle based on the 2D screen space coordinates; and
 for each pixel affected by the triangle, computing, based on the homogeneous triangle coefficients, a set of barycentric coefficients in viewer space, and performing a linear interpolation based on the set of viewer space barycentric coefficients and the viewer space attributes of the triangle vertices to obtain the attribute of the pixel affected by the triangle;
 wherein the homogeneous coefficients of the [vertex]triangle are $\tilde{a}_i, \tilde{b}_i, \tilde{c}_i$, and based on the viewer space coordinates they are calculated in $\tilde{a}_i = Y_{jh} \cdot W_k - Y_{kh} \cdot W_j$,

$\tilde{b}_i = X_{jh} \cdot W_k - X_{kh} \cdot W_j$, and $\tilde{c}_i = X_{jh} \cdot Y_{kh} - X_{kh} \cdot Y_{jh}$, where $j = i \bmod 3 + 1$, and $k = j \bmod 3 + 1$, and W_i and W_k are homogeneous components representing perspective correction parameters, where $i = 1, 2, 3$.

38. (Currently Amended) A method for obtaining an attribute within a triangle, comprising:
obtaining the vertices of a triangle, each vertex being represented by a set of coordinates in a world coordinate space and having at least one[an] attribute;

for each vertex, transforming the world space coordinates and the attribute of the vertex to coordinates and an attribute in viewer space to create viewer space coordinates and a viewer space attribute, said viewer space coordinates being homogeneous coordinates, computing a set of homogeneous coefficients of the [vertex]triangle based on the viewer space homogeneous vertex coordinates, said homogeneous triangle coefficients including perspective data, and projecting the viewer space coordinates of the vertex to coordinates in 2D screen space;

determining, in the 2D screen space, pixels that are affected by the triangle based on the 2D screen space coordinates; and

for each pixel affected by the triangle, computing, based on the homogeneous triangle coefficients, a set of barycentric coefficients in viewer space, and performing a linear interpolation based on the set of viewer space barycentric coefficients and the viewer space attributes of the triangle vertices to obtain the attribute of the pixel affected by the triangle;

wherein the homogeneous coefficients of the [vertex]triangle are $\tilde{a}_i, \tilde{b}_i, \tilde{c}_i$, and based on the viewer space vertex coordinates they are calculated in $\tilde{a}_i = Y_{jh} \cdot W_k - Y_{kh} \cdot W_j$, $\tilde{b}_i = X_{jh} \cdot W_k - X_{kh} \cdot W_j$, and $\tilde{c}_i = X_{jh} \cdot Y_{kh} - X_{kh} \cdot Y_{jh}$, where $j = i \bmod 3 + 1$, and $k = j \bmod 3 + 1$, and W_i and W_k are homogeneous components representing perspective correction parameters, where $i = 1, 2, 3$;

wherein α, β, γ represent the set of barycentric coefficients, $d1, d2, d3$, represent intermediate values, and the computations, for each pixel, of the set of barycentric coefficients, include calculating $d1, d2$ and $d3$, using the homogeneous triangle coefficients, $\tilde{a}_i, \tilde{b}_i, \tilde{c}_i$, in $d_i = (\tilde{a}_i \cdot X + \tilde{b}_i \cdot Y + \tilde{c}_i)$, and calculating the homogeneous space barycentric

coefficients, α, β, γ , using the intermediate values d_1, d_2, d_3 , in $\alpha = \frac{d_1}{d_1 + d_2 + d_3}$,

$$\beta = \frac{d_2}{d_1 + d_2 + d_3}, \text{ and } \gamma = \frac{d_3}{d_1 + d_2 + d_3}.$$

39. (Currently Amended) A method for obtaining an attribute within a triangle, comprising:

obtaining the vertices of a triangle, each vertex being represented by a set of coordinates in a world coordinate space and having at least one[an] attribute;

for each vertex, transforming the world space coordinates and the attribute of the vertex to coordinates and an attribute in viewer space to create viewer space coordinates and a viewer space attribute, said viewer space coordinates being homogeneous coordinates, computing a set of homogeneous coefficients of the [vertex]triangle based on the viewer space homogeneous vertex coordinates, said homogeneous triangle coefficients including perspective data, and projecting the viewer space coordinates of the vertex to coordinates in 2D screen space;

determining, in the 2D screen space, pixels that are affected by the triangle based on the 2D screen space coordinates; and

for each pixel affected by the triangle, computing, based on the homogeneous triangle coefficients, a set of barycentric coefficients in viewer space, and performing a linear interpolation based on the set of viewer space barycentric coefficients and the viewer space attributes of the triangle vertices to obtain the attribute of the pixel affected by the triangle;

wherein the homogeneous coefficients of the [vertex]triangle are $\tilde{a}_i, \tilde{b}_i, \tilde{c}_i$, and based on the viewer space coordinates they are calculated in $\tilde{a}_i = Y_{jh} \cdot W_k - Y_{kh} \cdot W_j$, $\tilde{b}_i = X_{jh} \cdot W_k - X_{kh} \cdot W_j$, and $\tilde{c}_i = X_{jh} \cdot Y_{kh} - X_{kh} \cdot Y_{jh}$, where $j = i \bmod 3 + 1$, and $k = j \bmod 3 + 1$, and W_i and W_k are homogeneous components representing perspective correction parameters, where $i = 1, 2, 3$;

wherein α, β, γ , represent the set of barycentric coefficients, d_1, d_2, d_3 , represent intermediate values, and the computations, for each pixel, of the set of barycentric coefficients, include calculating d_1, d_2 and d_3 , using the homogeneous coefficients, $\tilde{a}_i, \tilde{b}_i, \tilde{c}_i$, in $d_i = (\tilde{a}_i \cdot X + \tilde{b}_i \cdot Y + \tilde{c}_i)$, and calculating the homogeneous space barycentric coefficient:

α, β, γ , using the intermediate values d_1, d_2, d_3 , in $\alpha = \frac{d_1}{d_1 + d_2 + d_3}$, $\beta = \frac{d_2}{d_1 + d_2 + d_3}$, and $\gamma = \frac{d_3}{d_1 + d_2 + d_3}$

wherein the linear interpolation, for each pixel, includes calculation of Z_{pix} , a Z-coordinate in homogeneous space, W_{pix} , a perspective correction parameter per pixel], and Φ_{pix}], and attributes of the pixel in the homogeneous space Φ_{pix} , with the respective calculations being $Z_{pix} = \alpha \cdot Z1h + \beta \cdot Z2h + \gamma \cdot Z3h$, $W_{pix} = \alpha \cdot W1 + \beta \cdot W2 + \gamma \cdot W3h$, and $\Phi_{pix} = \alpha \cdot \Phi1h + \beta \cdot \Phi2h + \gamma \cdot \Phi3h$.

40. (Currently Amended) A system for obtaining an attribute within a triangle in homogeneous space, comprising:

means for obtaining the vertices of a triangle, each vertex being represented by a set of coordinates in a world coordinate space and having at least one[an] attribute;

means for transforming the world space coordinates and the attribute of each vertex to coordinates and an attribute in viewer space to create viewer space coordinates and a viewer space attribute, said viewer space coordinates being homogeneous coordinates;

means for computing a set of homogeneous coefficients of [each vertex]the triangle based on the viewer space vertex coordinates, said homogeneous triangle coefficients including perspective data;

means for projecting the viewer space homogeneous coordinates of the vertex to coordinates in 2D screen space;

means for determining, in the 2D screen space, pixels that are affected by the triangle based on the 2D screen space coordinates;

means for computing, based on the homogeneous triangle coefficients, a set of barycentric coefficients in viewer space for each pixel affected; and

means for performing a linear interpolation based on the set of viewer space barycentric coefficients and the viewer space attributes of the vertices to obtain the attribute of each pixel affected by the triangle;

wherein the homogeneous coefficients of the [vertex]triangle are $\tilde{a}_i, \tilde{b}_i, \tilde{c}_i$, and based

on the viewer space coordinates they are calculated in $\tilde{a}_i = Y_{jh} \cdot W_k - Y_{kh} \cdot W_j$,
 $\tilde{b}_i = X_{jh} \cdot W_k - X_{kh} \cdot W_j$, and $\tilde{c}_i = X_{jh} \cdot Y_{kh} - X_{kh} \cdot Y_{jh}$, where $j = i \bmod 3 + 1$, and $k = j \bmod 3 + 1$, and W_i and W_k are homogeneous components representing perspective correction parameters, where $i = 1, 2, 3$.

41. (Currently Amended) A method for obtaining an attribute within a triangle, comprising:

- means for obtaining the vertices of a triangle, each vertex being represented by a set of coordinates in a world coordinate space and having at least one[an] attribute;
- means for transforming the world space coordinates and the attribute of each vertex to coordinates and an attribute in viewer space to create viewer space coordinates and a viewer space attribute, said viewer space coordinates being homogeneous coordinates;
- means for computing a set of homogeneous coefficients of [each vertex]the triangle based on the viewer space vertex coordinates, said homogeneous triangle coefficients including perspective data;
- means for projecting the viewer space homogeneous coordinates of the vertex to coordinates in 2D screen space;
- means for determining, in the 2D screen space, pixels that are affected by the triangle based on the 2D screen space coordinates;
- means for computing, based on the homogeneous triangle coefficients, a set of barycentric coefficients in viewer space for each pixel affected; and
- means for performing a linear interpolation based on the set of viewer space barycentric coefficients and the viewer space attributes of the vertices to obtain the attribute of each pixel affected by the triangle;

wherein the homogeneous coefficients of the [vertex]triangle are $\tilde{a}_i, \tilde{b}_i, \tilde{c}_i$, and based on the viewer space vertex coordinates they are calculated in $\tilde{a}_i = Y_{jh} \cdot W_k - Y_{kh} \cdot W_j$,
 $\tilde{b}_i = X_{jh} \cdot W_k - X_{kh} \cdot W_j$, and $\tilde{c}_i = X_{jh} \cdot Y_{kh} - X_{kh} \cdot Y_{jh}$, where $j = i \bmod 3 + 1$, and $k = j \bmod 3 + 1$, and W_i and W_k are perspective correction parameters, where $i = 1, 2, 3$;

wherein α, β, γ , represent the set of barycentric coefficients, $d1, d2, d3$, represent intermediate values, and the computations, for each pixel, of the set of barycentric coefficients, include calculating $d1, d2$ and $d3$, using the homogeneous triangle coefficient.,

$\tilde{a}_i, \tilde{b}_i, \tilde{c}_i$, in $d_i = (\tilde{a}_i \cdot X + \tilde{b}_i \cdot Y + \tilde{c}_i)$, and calculating the homogeneous space barycentric coefficients, α, β, γ , using the intermediate values d_1, d_2, d_3 , in $\alpha = \frac{d_1}{d_1 + d_2 + d_3}$, $\beta = \frac{d_2}{d_1 + d_2 + d_3}$, and $\gamma = \frac{d_3}{d_1 + d_2 + d_3}$.

42. (Currently Amended) A method for obtaining an attribute within a triangle, comprising:

- means for obtaining the vertices of a triangle, each vertex being represented by a set of coordinates in a world coordinate space and having at least one[an] attribute;
- means for transforming the world space coordinates and the attribute of each vertex to coordinates and an attribute in viewer space to create viewer space coordinates and a viewer space attribute, said viewer space coordinates being homogeneous coordinates;
- means for computing a set of homogeneous coefficients of [each vertex]the triangle based on the viewer space vertex coordinates, said homogeneous triangle coefficients including perspective data;
- means for projecting the viewer space homogeneous coordinates of the vertex to coordinates in 2D screen space;
- means for determining, in the 2D screen space, pixels that are affected by the triangle based on the 2D screen space coordinates;
- means for computing, based on the homogeneous triangle coefficients, a set of barycentric coefficients in viewer space for each pixel affected; and
- means for performing a linear interpolation based on the set of viewer space barycentric coefficients and the viewer space attributes of the vertices to obtain the attribute of each pixel affected by the triangle;

wherein the homogeneous coefficients of the [vertex]triangle are $\tilde{a}_i, \tilde{b}_i, \tilde{c}_i$, and based on the viewer space coordinates they are calculated in $\tilde{a}_i = Y_{jh} \cdot W_k - Y_{kh} \cdot W_j$, $\tilde{b}_i = X_{jh} \cdot W_k - X_{kh} \cdot W_j$, and $\tilde{c}_i = X_{jh} \cdot Y_{kh} - X_{kh} \cdot Y_{jh}$, where $j = i \bmod 3 + 1$, and $k = j \bmod 3 + 1$, and W_i and W_k are homogeneous components representing perspective correction parameters, where $i = 1, 2, 3$;

wherein α, β, γ , represent the set of barycentric coefficients, d_1, d_2, d_3 , represent

intermediate values, and the computations, for each pixel, of the set of barycentric coefficients, include calculating d1, d2 and d3, using the homogeneous triangle coefficients.

$\tilde{a}_i, \tilde{b}_i, \tilde{c}_i$, in $d_i = (\tilde{a}_i \cdot X + \tilde{b}_i \cdot Y + \tilde{c}_i)$, and calculating the homogeneous space barycentric

coefficients, α, β, γ , using the intermediate values d1, d2, d3, in $\alpha = \frac{d_1}{d_1 + d_2 + d_3}$,

$$\beta = \frac{d_2}{d_1 + d_2 + d_3}, \text{ and } \gamma = \frac{d_3}{d_1 + d_2 + d_3}$$

wherein the linear interpolation, for each pixel, includes calculation of Z_pix, a Z-coordinate in homogeneous space, W_pix, a perspective correction parameter per pixel, [and Phi_pix,] and attributes of the pixel in the homogeneous space Phi_pix, with the respective calculations being $Z_pix = \alpha \cdot Z1h + \beta \cdot Z2h + \gamma \cdot Z3h$, $W_pix = \alpha \cdot W1 + \beta \cdot W2 + \gamma \cdot W3h$, and $Phi_pix = \alpha \cdot P1hi + \beta \cdot P2hi + \gamma \cdot P3hi$.

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